Suisun Marsh Monitoring Program
Channel Water Salinity Report

Reporting Period: October 2004

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1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per SWRCB Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity. Specific electrical conductivity is referred to in the reports as "specific conductance". The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below:

Station Identification	Station Name	General Location	Classification
C-2*	Collinsville	Western Delta	Compliance Station
S-64	National Steel	Eastern Suisun Marsh	Compliance Station
S-49	Beldon's Landing	North-Central Suisun Marsh	Compliance Station
S-42	Volanti	North-Western Suisun Marsh	Compliance Station
S-21	Sunrise	North-Western Suisun Marsh	Compliance Station

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh.

Station Identification	Station Name	General Location	Classification
S-97	Ibis	Western Suisun Marsh	Monitoring Station
S-35	Morrow Island	South-Western Suisun Marsh	Monitoring Station

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

2. Monitoring Results

2.1 Channel Water Salinity Compliance

During the month of October, 2004, salinity conditions at all five compliance stations are in compliance with channel water salinity standards of SWRCB (Table 1). Compliance with standards for the month of October was determined for each compliance station by comparing the progressive daily mean of high-tide specific conductance (SC) with respective standards. The standard for all the compliance stations (i.e. C-2, S-64, S-49, S-42, S-21) was 19.0 mS/cm during October 2004. Table 1 lists monthly mean high-tide SC at these compliance stations. The progressive daily mean (PDM) is the monthly average of both daily high-tide SC values. The mathematical equation is shown below.

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\text{\# days of the month}}$$

2.2 Delta Outflow

The October Delta outflow ranged between 3,100 cfs to 16,700 cfs. Outflow was steady for most of the month, until the first site of precipitation on October 19, 2004. Thereafter, more precipitation events resulted outflow to increase and peaked at 16,700 cfs. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for October is listed below:

Month	Mean NDOI (cubic feet per second)
October	7,556

2.3 Rainfall

Total monthly rainfall at the Waterman Gauging Station in Fairfield during October 2004 is listed below: The largest precipitation occurred on October 20, 2004.

Month	Total Rainfall (inches)
October	2.30

2.4 Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during October 2004 is summarized below. This year gate operation was with gate 1 being in a closed position throughout the control season due to cable failure. To avoid any interruption to the fish passage study and control salinity purposes, the repair work for gate 1 will not occur until the end of the control season 2004-2005.

Date	Gate status	Flashboards status	Boat Lock status
October 1 - 11	3 gates open	Removed	Closed
October 12 - 25	3 gates operating	Installed	Open
October 26 - 31	3 gates operating	Installed	Closed

This year, the 2004 salmon fish passage study commenced on September 28, 2004 and was scheduled to conclude on November 9, 2004. The study involved three phases of gate operations. Phase I, from September 28 through October 11, 2004, had the configuration of gates open, flashboards removed, and boat lock closed. Phase II, from October 12 through October 25, 2004, had the configuration of gates operating, flashboards installed, and boat lock open. Phase III, from October 26 through November 9, 2004, was with gates operating, flashboards installed, and boat lock closed.

3. Discussion

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- delta outflow;
- tidal exchange;
- rainfall and local creek inflow;

- managed wetland operations; and,
- operation of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions during the Reporting Period

During October 2004, salinity levels at Collinsville(C-2), National Steel(S-64), and Beldons(S-49) varied between 7.0 mS/cm and 15.0 mS/cm, whereas at Sunrise Club(S-21) and Volanti(S-42), it varied between 13.0 mS/cm and 15.3 mS/cm as shown in Figure 1. At the two monitoring stations(S-97 and S-35) salinity levels ranged from 15.6 mS/cm and 17.4 mS/cm as shown in Figure 2. On October 12, 2004, the SMSCG operated in support of the 2004 fall salmon passage study. As a result of gate operation, Collinsville salinity slightly increased as expected since the fresh water amount has been diverted into Montezuma slough. However, salinity reduction at National Steel began to drop within a day of gate operations, and Beldons soon follow a few days later along with Sunrise Club, and Volanti a few more days thereafter due to the proximity of these sites being further away from the gate. For Morrow(S-35) and Ibis(S-97), both monitoring sites started off above 15.0 mS/cm and remained stable throughout the month as shown in Figure 2. Overall, salinity levels were stable and well below the standard of 19.0 throughout October at all compliance and monitoring sites. At the end of October, salinity levels slightly increased.

Except at sites Morrow and Ibis, channel water salinity conditions in the marsh appeared to be influenced more by gate operations than outflow in October 2004 because outflow was not apparent until the last week of October and salinity reduction was apparent by mid-October.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for October 2004 were compared with means for those months during the previous nine years (Figure 4).

Means salinity pattern of all compliance and monitoring stations are similar to that of 1996, however, with slightly higher magnitude. Also, S35 was higher than that of S97 in 2004, whereas S35 was lower than S97 in 1996. This is probably due to the water exchange mechanisms along Goodyear slough over the years. The mechanisms have become inefficient to allow lower water quality water along Goodyear slough resulting in higher saline water to intrude along Goodyear slough. However, compared to previous nine years, October 2004 salinity levels were ranked fifth in high Specific Conductance.

Table 1

Monthly Mean High Tide Specific Conductance at Suisun Marsh Water Quality Compliance Stations

October 2004

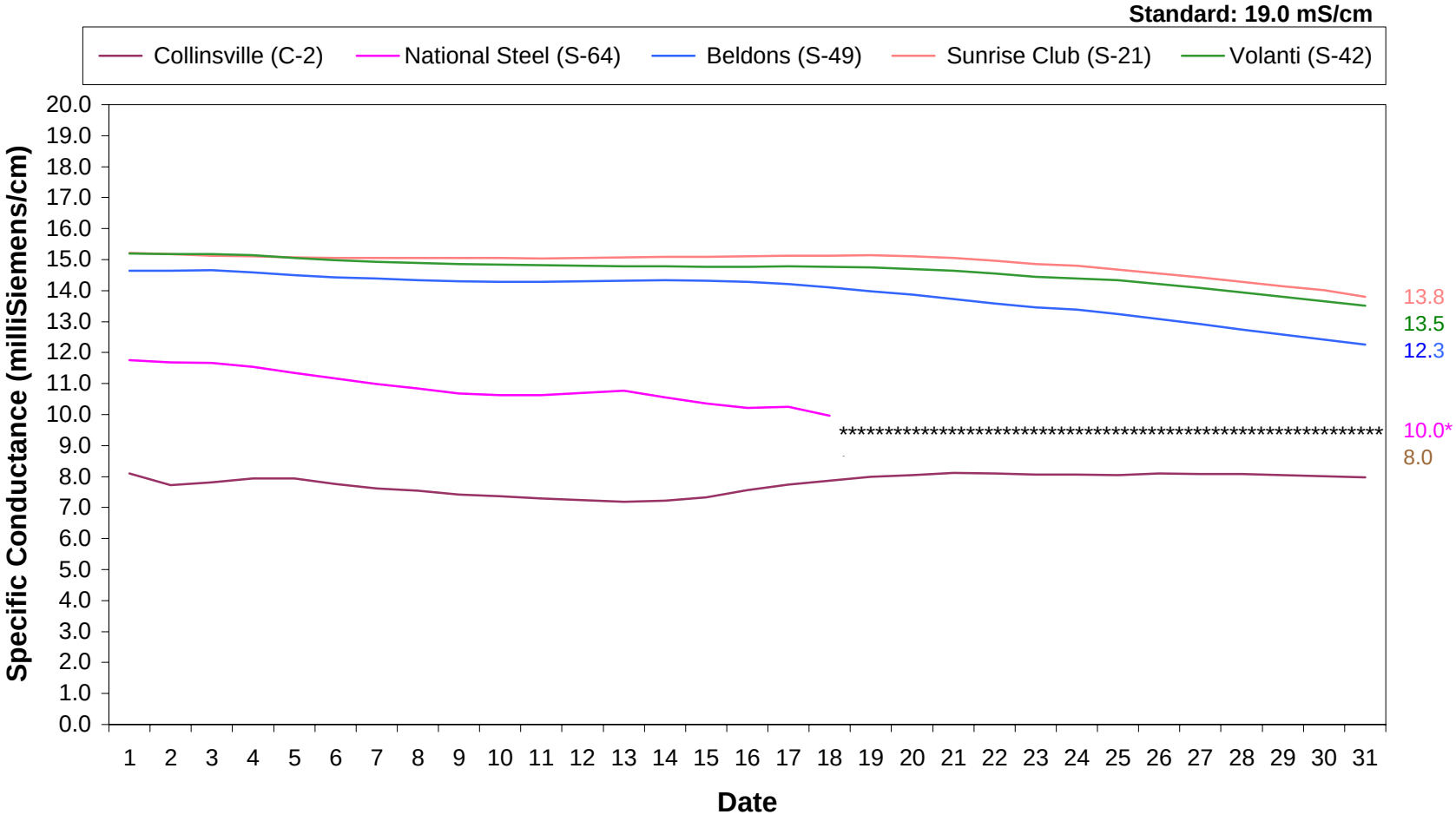
Station	Specific Conductance (mS/cm)*	Standard	Standard meet?
C-2**	8.0	19.0	Yes
S-64	10.0***	19.0	Yes
S-49	12.3	19.0	Yes
S-42	13.5	19.0	Yes
S-21	13.8	19.0	Yes

*milliSiemens per centimeter

**The representative data from nearby USBR station is used in lieu of data from station C-2.

*** S64 had 13 days of missing salinity data due to salinity equipment failure. The last recorded value is 10.0 mS/cm on 10/18/04. This value does not reflect the end of month PDM value, however, salinity standard at this location was probably meet since S64 is located between C-2B and S-49, and both of these compliance stations meet salinity standards for October as shown above.

Figure 1. Suisun Marsh Progressive Mean High Tide Specific Conductance for October 2004



* = S64 missing data due to salinity equipment failure.

Figure 2. Suisun Marsh Progressive Mean High-Tide Specific Conductance For October 2004

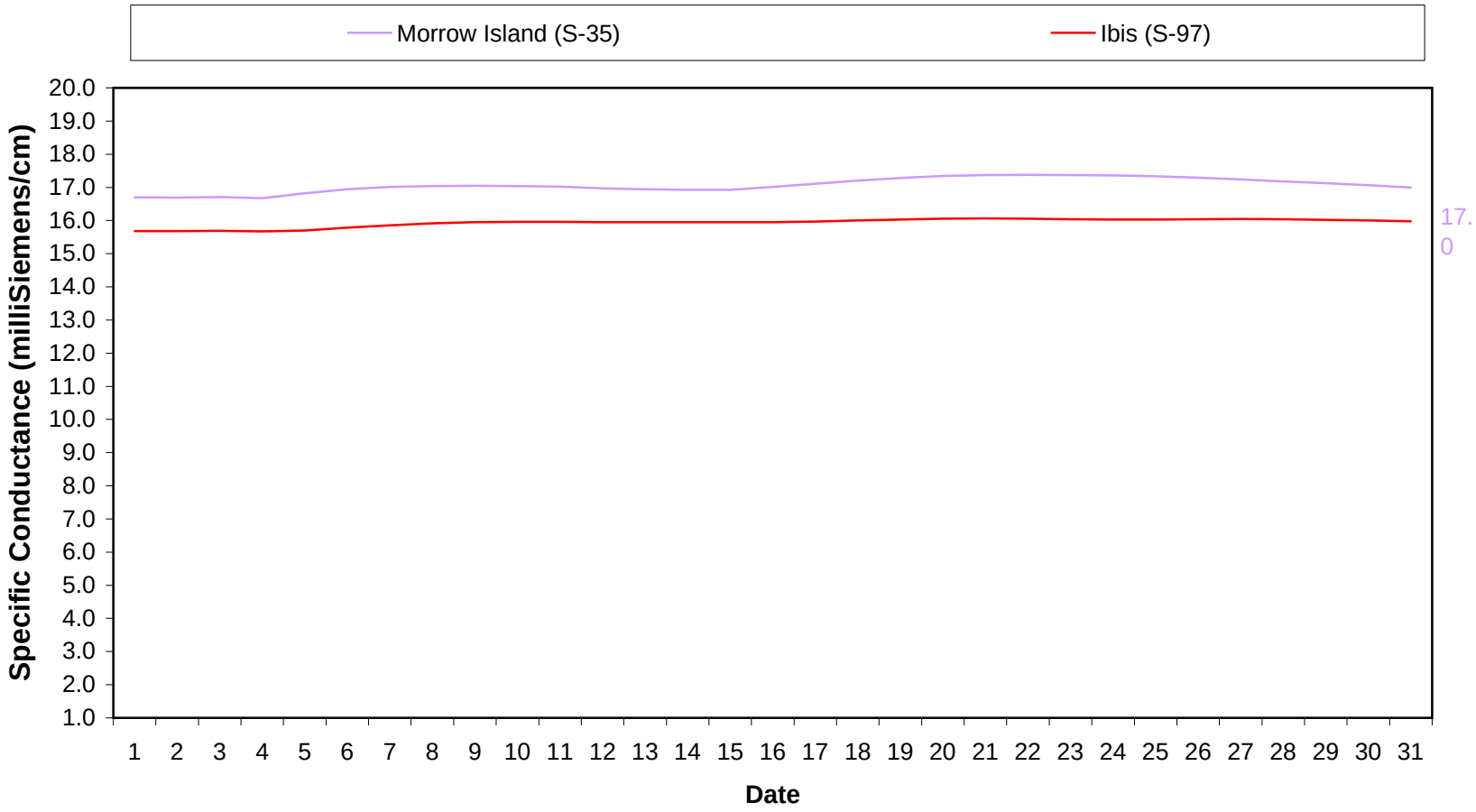
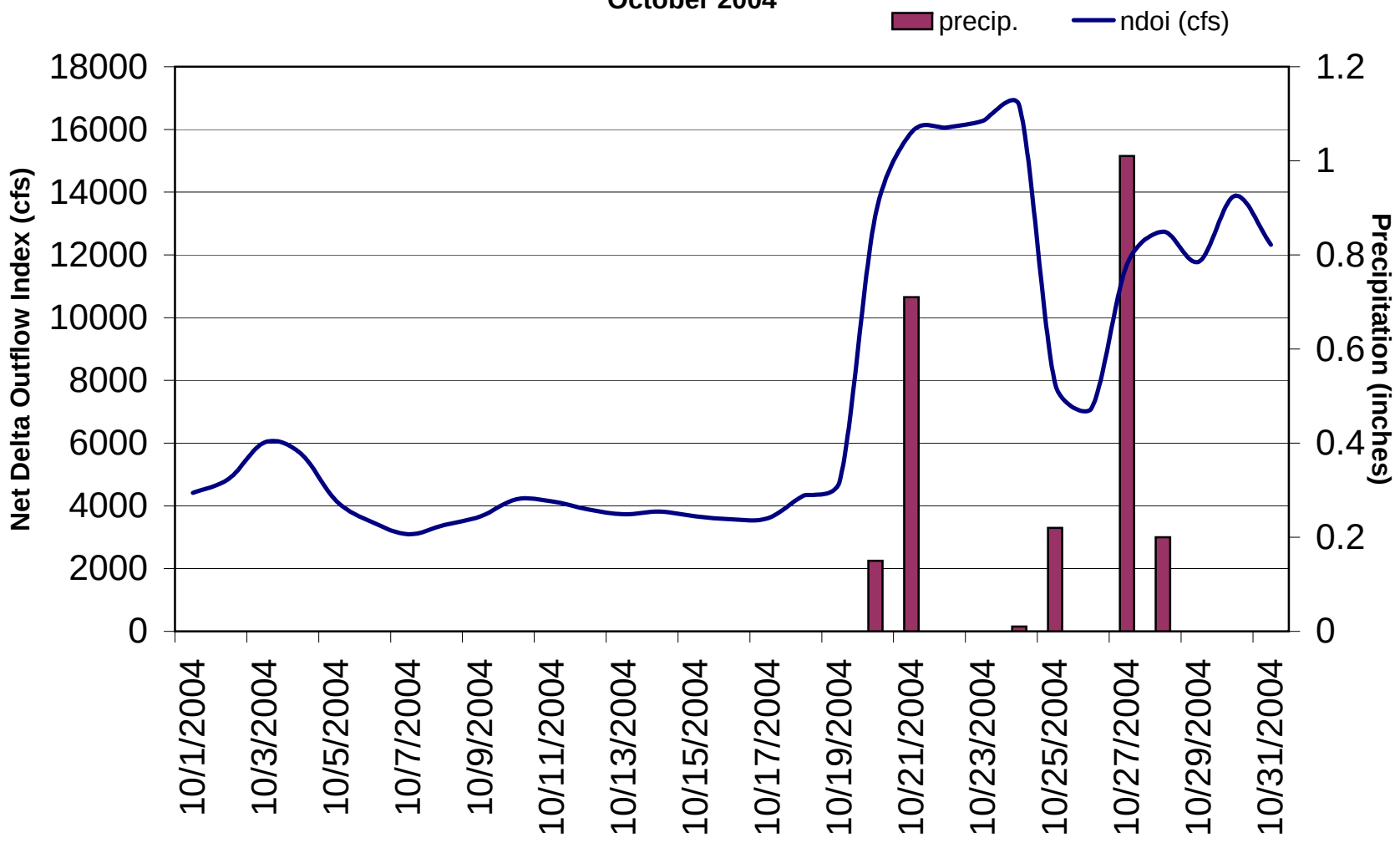
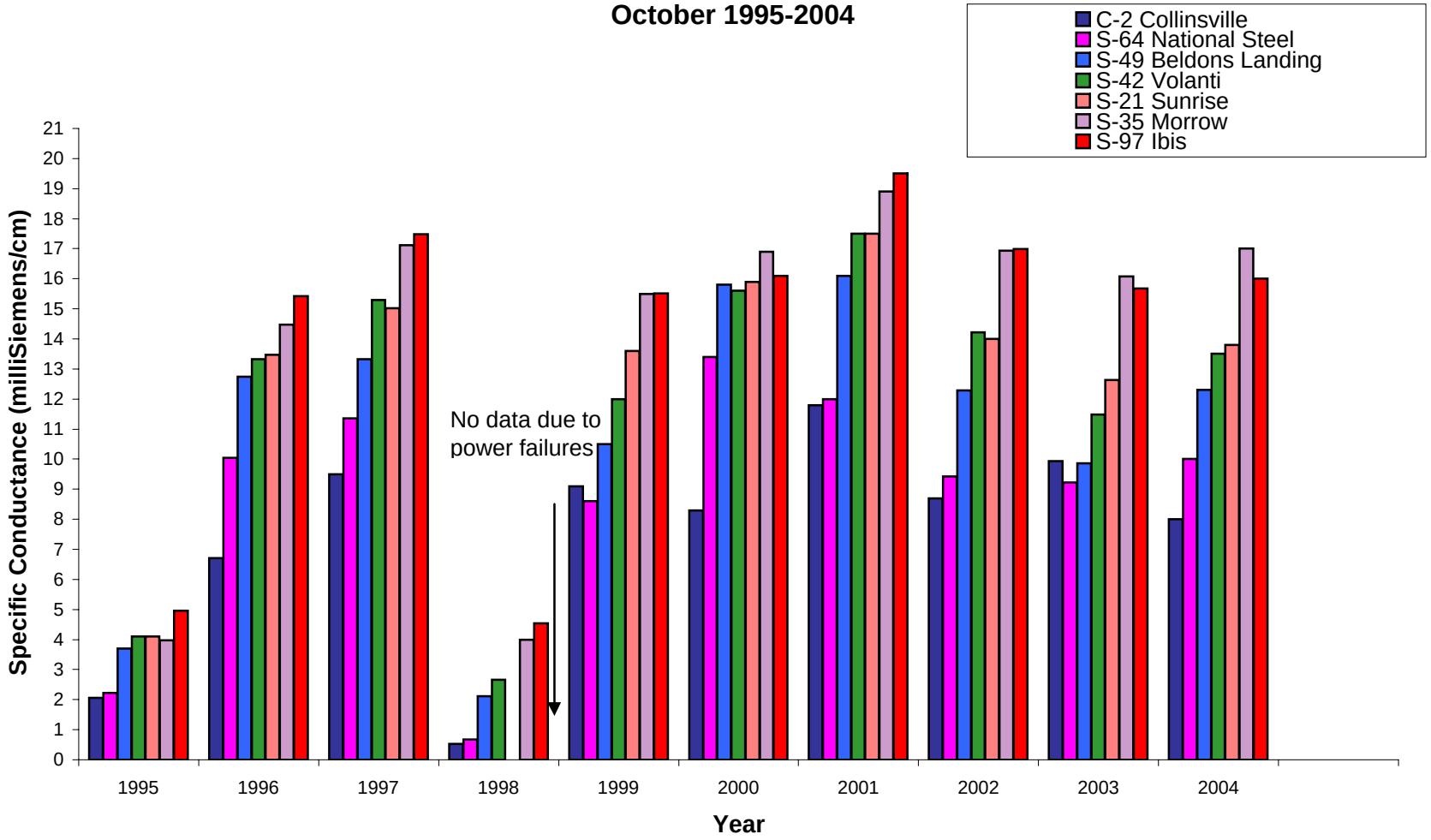


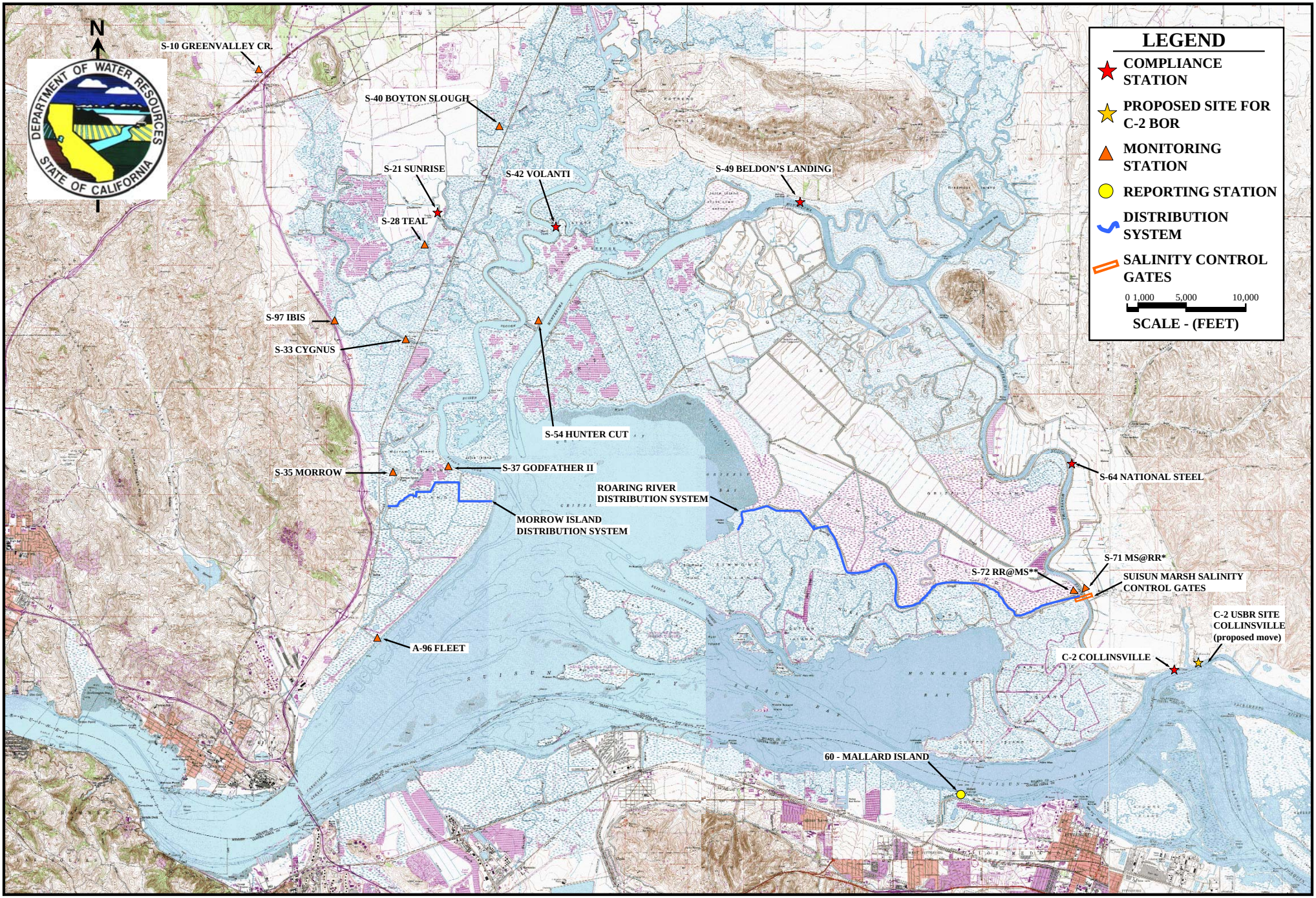
Figure 3. Daily Net Delta Outflow Index and Precipitation*
October 2004



*Preliminary DWR, O&M data

Figure 4. Monthly Mean Specific Conductance at High Tide: Comparison of Monthly Values for Selected Stations October 1995-2004





SUISUN MARSH PROGRAM WATER QUALITY MONITORING AND CONTROL FACILITIES